# PUBLIC UTILITY REGULATORY POLICIES ACT

## PUBLIC HEARING

February 20, 2007

Columbia City Council Chambers
701 East Broadway
Columbia, Missouri

BEFORE:

John Conway, Hearing Officer
Greg Macis, Board Member

REPORTED BY:

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MR. DASHO: Good afternoon. I'm Dan Dasho and I'm the Director of Water and Light for the city utility here in Columbia. And we're here today as part of a public hearing that's going to consider net metering and interconnection agreements.

And I want to talk a little bit about the public hearing process. The council is the governing body of the utility for the City of Columbia. And we're charged with putting together some materials to take to them regarding the issue of net metering and interconnection agreements.

And to do that, we have put together a couple of speakers and would also like to take comments from the public as well. And we'll put that all together and present it to the council with some recommendations and the council will then take action on those items specifically.

And tonight we have with us the chairman of the Water and Light Advisory Board, who's going to be acting as our presiding public hearing officer, and that's John Conway. And at this time, I'm going to turn over the public hearing to John.

HEARING OFFICER CONWAY: Thank you, Dan. Once again, my name is John Conway. I'm chairman of the Water and Light Advisory Board and will be serving as the public hearing officer for the meeting.

The reason we're holding the public hearing is

due in part to the passage of the Energy Policy Act of 2005, commonly referred to as the EPAct 2005. EPAct 2005 renews and expands the federal government's practice of requiring that state regulators and non-regulated utilities of a certain size to consider the case for the adoption of certain rate-making standards.

Specifically, EPAct 2005 has added five new standards to the existing ten standards outlined in the previous Public Utility Regulatory Policies Act of 1978, referred to as PURPA 1978, and also the Energy Policy Act of 1992, referred to as EPAct of 1992.

These standards have been added to Section 111, part D of PURPA and consist of five elements. One is to address the net metering and interconnection; two, is the dependence on fuel sources; three, the fossil fuel generation efficiency; four is the time-based metering; and lastly, number five is communications.

The outline of the procedural requirements for consideration and determination specified in PURPA and the Energy Policy Act states that we must engage in formal consideration of whether to adopt the five new federal provisions. It is not required for the City of Columbia to adopt these standards, but a formal process to review and take public comment is necessary.

Tonight we will -- we will hear from

Mr. Warren Wood. Warren is the Director of Utility Operations Division of the Missouri Public Service Commission. Warren will provide an overview of, one, the net metering legislation, a brief discussion on Missouri's Consumer Clean Energy Act; secondly, the Commission net metering rule, the PSC -- PSC rule that implements the Consumer Clean Energy Act.

Additionally, Warren will have discussion on the interconnection equipment. This is the equipment typically required for a small-scale renewable interconnection with the grid; and, lastly, the EPAct net metering and interconnection provisions. Warren will briefly touch also on the other three EPAct provisions that may be of interest.

Jay Hasheider of the energy -- who is the Energy Services Supervisor for the Columbia Water and Light Department will present the current City of Columbia net metering ordinance and will follow with a position paper which is a draft of the amendment to the current net metering ordinance for small-scale solar photovoltaic applications and interconnection agreements.

Once these presentations are complete, we will take comments from the audience as well as take written comments from Columbia Water and Light customers for two weeks until March the 6th, 2007. Those wishing to make comment tonight in person will be requested to fill out the form that's provided on the table stating your name, address and

phone number. This is located at the table at the entrance to the Council Chambers.

We have also a court reporter present this evening too, who will be making a complete transcript of the event, will provide a copy to the Water and Light Department. The transcript will be also posted on the Columbia Water and Light website for two weeks from the date of receipt.

This also -- also, the public hearing is being broadcast live and will be rebroadcast on the City of Columbia's government access channel, Media-- Mediacom 13 at 6:00 a.m., 10:00 a.m., 6:00 p.m. through February 25th.

At the end of the prescribed comment period, the City staff will review the comments presented during this meeting and also those in written format, will make final recommendations to the Water and Light Advisory Board and ultimately to the City Council.

So at this time I'd like to introduce Mr. Warren Wood.

MR. WOOD: Okay. Thank you very much. And good evening. It's a pleasure to have this opportunity to speak with the City of Columbia Water and Light Advisory Board on a subject that I've been working on for several years, net metering and interconnection with our electric utilities.

My presentation will focus on four particular issues: One, the net metering legislation; two, the net

metering rule that was adopted by the Commission following passage of that legislation; interconnection equipment for small-scale generating devices, customer-owned generation; and finally, the Energy Policy Act net metering and interconnection provisions, two of the five that you had mentioned.

First, the legislation. In 2002, the Consumer Clean Energy Act became law in the state of Missouri. The law basically implements 1978 PURPA provisions for small-scale customer-owned generators.

Some of the major provisions of the Consumer Clean Energy Act largely applies to renewables, less than or equal to 100 kilowatts in size. It applies to investor-owned utilities, municipals and cooperatives, which is an expansion from what the original 1978 PURPA application was.

It requires dual meet -- dual metering, which can be accomplished through a single digital meter capable of reading power in both directions. And it applies retail rates to deliver energy and avoided rates to exported energy from the customer generator back to the utility.

Additional provisions, it limits participation to the lesser of 1/10th of 1 percent of the peak from the previous year or 10,000 kilowatts. I believe in the City of Columbia the 1/10th of 1 percent provision would likely control. It requires adherence to safety standards, liability

insurance provisions and requires development by the Public Service Commission of a simplified contract between the utility and the customer generator.

Now, following the passage of that statute and per the statute, the Public Service Commission held a number of technical conferences with interested parties. We developed a rule that was well supported by those parties recognizing the limitations placed on the rule by the statutory language.

By the way, I've provided a copy of the Consumer Clean Energy Act and the rule to Tina Worley. And there -- the statute is 386.887 Revised Statutes of Missouri readily available on the Internet and the consumer -- the net metering rule that was adopted, 4 CSR 240-20.065 is available on the Secretary of State's website.

The rule provisions follow the statute closely, include $100,000 liability insurance provision, which is largely met from who customers are in contact with through their homeowners insurance policy. There are contracts for approval of transactions between the customer generator, basically the household owner, and the utility. And the contract covers installation, operation, disconnection, ownership and dispute resolution. It also covers inspection and certification and testing provisions.

Now, interconnection equipment, this is

what -- this is what you see when you go to a net metering -- facility that's hooked up for net metering. You'll see the energy source and its conversion to electricity. In this case, it would be the photovoltaic panels typical-- typically the silicon cells, much like are in computer chips with the boron coating, and it -- you're converting solar energy to electron flow or energy.

You have the inverter for alt-- for taking that direct current from the photovoltaic, converting it to an AC current. And that is als-- that is where you typically have your safety disconnects, the things that pre-- protect linemen in the event that there's loss of power on the grid.

There's the isolation switch. And other optional equipment, you may see an optional meter for measuring energy from the photovoltaic or windmill. You may see battery backups, you may see alternative energy sources also attached to that inverter.

Here's a diagram of some of the major equipment. And this is the photovoltaic, the array and cells. Here's your inverter which, you know, it's typically a rather nondescript box with some information you can get for reading power flow and total metered energy. You have possible battery backup, you may have an AC generator.

And all of this is then hooked in through the power panel on the house, typically on the customer's side of

the meter. It's -- it's not hooked up on the wire side outside of the meter on the utility side. It typically is coming in through a breaker into the customer's power panel in their house.

There is such a facility at -- on the Governor Office Building in Jefferson City. If a group has an interest in seeing an operating net metering facility, the Public Service Commission is always happy to, you know, conduct a tour, take people up and show them the different aspects of the system. It's relatively simple.

These are the photovoltaic panels, it's about 2100 watts. The inverter that converts over to AC and also provides for the -- the disconnect for safety, the isolation switch for conducting maintenance on the system, and another example where you don't have the AC generator. Instead, you've got the batteries and photovoltaic.

Wind turbine, this is the optional meter some customers have. Actually, many of the inverters include a metering function so you don't have that. Your isolation switch, the house power panel and then the dual metering, which it's my understanding right now most of that's being accomplished through a dual read, a digital meter, as opposed to two actual meters.

Now the Energy Policy Act. One of the provisions I was going to talk about was the net metering

provision. This is the standard in the Energy Policy Act '05 regarding net metering.

There are some time limitations for consideration of the standard by different authorities such as the Columbia Water and Light Municipal Electric Utility. August '07, must commence consideration of the standard. And by August '08, must complete consideration and/or adoption of the standard.

Now, of course, the Energy Policy Act does not require implementation of the standard, but it does require consideration. And what that means is you may opt to do nothing in this regard. Then again, you may adopt the standard that you consider appropriate for the community.

Now, each of the Energy Policy Act's provisions includes prior state action measures. And basically this is -- you might look at, well, have we previously already done some sort of consideration that makes this, you know -- we've basically already adopted a standard, we've already considered this standard or a similar standard and opted to do nothing.

In this case, the state legislature has voted on implementation of the net metering standard that is now in the Consumer Clean Energy Act, 386.887. And, of course, different parties may disagree with that interpretation, but it's the staff's opinion at the Public Service Commission that

net metering has been addressed through prior state action of the state legislature.

Another standard we were going to talk about is the interconnection standard. And this is that standard. It's in the Energy Policy Act. This is one of the few standards that specifies a specific IEEE standard. This refers to IEEE standard 1547, which is a relatively new IEEE standard. There's the remainder of that interconnection standard.

The time limitations on consideration of the interconnection standard are tighter. Basically August '06 for commencing consideration of the standard and by August of '07, complete consideration and/or adoption of the standard.

I should note relative to the Public Service Commission and our rules, we will be -- well, it is staff's recommendation to the Commission that we revise our net metering rule because it does make specific reference to an IEEE standard that is not in the Energy Policy Act.

The prior state action language reads exactly the same for this standard as well. There's some disagreement between the parties and current Commission proceedings as to if prior state action covers interconnection provisions or not. It's one of the things I anticipate the Commission will hold hearings on as to -- with our investor-owned utilities as to if prior standards provide coverage on this or not.

It's my opinion that the -- while the investor-owned utilities have interconnection provisions, they do not specifically refer to IEEE 1547. And at a minimum, that's probably one item that will need to be addressed.

This is the difference in the IEEE standard I'd noted. The IEEE standard 929-2000 and UL-1741 kind of go hand in hand as the UL standard is really a testing standard for the provisions outlined in IEEE 929. The IEEE standard 1547 is just the more recent standard. And they -- they don't completely overlap, but there are a number of common attributes to both of them.

That concludes my presentation. Please -- I'd welcome you to contact me with any questions in the future and, of course, I'm happy to answer any questions you may have now.

HEARING OFFICER CONWAY: Thank you, Warren.

Next, we'll move to Jay for his presentation.

MR. HASHEIDER: My name is Jay Hasheider. I'm the Energy Services Supervisor for the Water and Light Department. And I want to address two -- two different aspects of net metering and interconnection.

The first is the existing ordinance that is in place with the City of Columbia for net metering. And that ordinance specifically states that the customer generator rate is available to any customer that owns, operates -- owns and

operates a solar wind or biomass generating facility or hydrogen fuel cell with a capacity of not more than 100 kilowatts which is located at the customer's premises, is permanently interconnected and operates in parallel with the Department's existing transmission and distribution facilities and is intended primarily to offset part or all of the customer's own electric energy requirements.

The customer generator rate is applicable to residential, small general service or a large general service customer who contracts for service supplied at one point of delivery. The rate is applicable to single- and three-phase customers.

The customer generator is eligible for a net metering credit for all energy supplied to the Department system from a qualified net metering unit. Applicable charges will be calculated for all energy supplied to the customer generator based on the applicable rates for the customer class.

All energy supplied by the customer generator will be credited at the following rate per kilowatt hour regardless of customer class: and that is two cents per kilowatt hour.

Customers will be required to furnish their own protective and other necessary equipment, which must comply with specifications of the Department. This is

ordinance Section 27-120.1 of existing ordinance. This is the staff's -- the current net metering ordinance that is applied to the City of Columbia.

In cases of small-scale solar electric systems, the -- the Department is following the following report -- introducing the following report to the -- to the Water and Light Board. Small-scale sized end renewable energy projects such as rooftop solar panels are gaining momentum across the country, including in mid-Missouri.

Columbia Water and Light has fielded numerous requests for interconnection information and is anticipating that a formal request will be received in the near future. Given Columbia's unique role as the only Missouri utility to have a renewable energy portfolio standard, it is timely for the Department to consider adopting policies and procedures for such interconnections.

Traditionally, projects connecting independent generators to an electric utility have involved large-scale installations. By their nature and size, such projects have included extensive engineering study and design work, which has ensured performance standards and interconnection compatibility.

This is changing for small-scale renewable energy projects, which can now avoid the need for customized engineering by the use of equipment specifically designed and

certified for interconnection projects. Utilities across the country are finding it beneficial to provide access for small-scale renewable energy projects. Boston Energy in Texas, Jacksonville Electric Authority in Florida and Pacific Gas and Electric, PG&E, in California are examples of such utilities that have adopted simple and open interconnection policies.

PG&E has the largest number of interconnections with over 10,000 small-scale solar interconnections providing just over 1 percent of their peak load. They have found that safety and compatibility issues can be met by incorporating equipment and installation standards from credible organizations such as Underwriters Laboratory and the Institute of Electrical and Electronic Engineers, IEEE.

Beyond installation concerns, utilities and independent generators must also construct a financial arrangement for any electricity that is sent into the utility's system. Net metering is commonly understood to tran-- to describe a transaction in which the customer trades electricity with the utility.

A single meter, for example, can measure electricity flowing to the utility from a solar array on sunny days when production exceeds consumption and then reverses direction to measure the amount of electricity used by the

customer on cloudy days or at night. At the end of the month, the customer is billed for the difference or the net amount of electricity used over the month's time.

Most solar -- solar owners use more electricity in their household than they produce each month, so they still have a residual amount on their monthly bill. Should, however, the solar system produce more electricity than the customer uses during the month, a credit can be carried over to the subsequent month but only on a limited basis.

Currently, Missouri law requires a different type of metering and financial transaction. Missouri CSR 240-20.065 called net metering actually requires utilities to meter electricity flow separately. It specifies that utilities separately meter any electricity used by the customer any the electricity that is sold to the utility by an interconnected power generator.

It also requires the utility to pay avoided costs for any electricity that is sold to the utility. Avoided cost represents the cost that the utility avoids when it purchases power from an independent generator. Typically it is an average cost of wholesale power.

Since CSR 240 is applicable to all utilities in Missouri, any installation in Columbia must, thus, include meters to separately measure the two electric flows and must

pay avoided costs for any electricity sold to the utility system.

Determining avoided costs for solar energy is more complex than identifying the average power cost. An analysis of the value of solar-produced electricity shows cost of power that displaces are significantly higher than the utility's average wholesale power costs. This is because solar energy is both a daytime source of power and a renewable resource. These two independent attributes of solar energy make it more valuable than other power resources.

To determine the value of electricity produced only during the daytime, an investigation was conducted of the hourly prices for the wholesale power of the day-ahead market hosted by the Midwest Independent System Operator, MISO.

Over one year of data was used to develop average hourly power costs for a typical day. These hourly costs are depicted in Exhibit A. Between midnight and 6:00 a.m. prices are at their lowest and the non-daylight period, as a whole, averages $42 per megawatt hour.

During periods of daylight, however, when electric production from solar panels occurs, the market prices rise to an average of $63 per megawatt hour. Since Columbia both purchases and sells electricity in the day-ahead market, this price of $63 can be considered as an index for the avoided costs of daytime electricity.

Besides being produced during daylight hours, solar energy is also a renewable resource. This renewable attribute further enhances the value of solar power because it helps the Department meet its renewable energy requirement.

Examination of two independent renewable projects that the Department has contracts for, the Jefferson City Landfill and the Blue Grass Ridge Wind Farm, show that a renewable energy attribute increases the value of electricity by an average of $8 per megawatt hour above non-renewable energy -- non-renewable forms of energy.

The combination of daytime production value and the renewable energy attribute of solar electricity brings the avoided cost for this energy source to $71 per megawatt hour, which is approximately equal to the Department's non-summer retail rate of $76 per megawatt hour or 7.6 cents per kilowatt hour for its customers.

This price equivalence shows the utility to offer allows -- this price equivalence allows the utility to offer the financial equivalent of net metering to any small-scale solar system while still paying the avoided costs required by state law. And that's the end of my remarks.

HEARING OFFICER CONWAY: Thank you, Jay.

We'll move now to public comment. Is there any public comment? There being no public comment --

MR. CUNNINGHAM: Just really quick --

HEARING OFFICER CONWAY: Might have you state your name and address and then we'll need to swear you in with the court reporter.

MR. CUNNINGHAM: My name is Frank Cunningham. I live at 1112 Pheasant Run, Columbia, Missouri.

(Witness sworn.)

MR. CUNNINGHAM: I'm not really familiar with public hearings and so I'm not sure if this is the right time to state these items, but I just want to say I fully support Water and Light and what they're doing here. I had a couple questions and maybe that may be another point in time or maybe Jay can answer those now.

The first question is on the -- the annualized zeroing of the utility bill, does that take into account the base meter charge or will there continue to be a base meter charge and how have the other utilities done that in the past that do net metering across the country?

MR. HASHEIDER: Base meter charge being the --

MR. CUNNINGHAM: The base charge on the meter.

MR. HASHEIDER: I have to say, I'm not sure what the other utilities across the country are doing in terms of the -- that particular charge. This would not affect the --

MR. CUNNINGHAM: Okay. So that's -- it's just for the kilowatt hours used and generated back and forth?

MR. HASHEIDER: That's correct.

MR. DASHO: Frank, just a comment.

MR. CUNNINGHAM: Go ahead.

MR. DASHO: The base charge or the meter charge that the customer gets is associated with fixed charges on providing service. That doesn't change regardless if you have a photovoltaic array or not, so you continue to pay those costs. And that's done throughout the country.

MR. CUNNINGHAM: Okay. Great. And the next question I had was, on the metering itself and the renewable portfolio, how is it that Water and Light plans to measure that amount, or is that still being worked out?

MR. HASHEIDER: We are assuming that we would be able to make a calculation of the production based on known production of --

MR. CUNNINGHAM: So off the meter that you'll be using?

MR. HASHEIDER: I'm sorry?

MR. CUNNINGHAM: Off the meter that you will be using as the -- the utility meter?

MR. HASHEIDER: It would be our contention that the entire production of electricity from the solar panel would be allowed as a renewable energy credit, which is also -- because some of that energy from the solar panel, most of it actually, would be used in the customer's --

MR. CUNNINGHAM: Yeah.

MR. HASHEIDER: -- household.

MR. CUNNINGHAM: Exactly.

MR. HASHEIDER: That meter -- the meter would not see that amount of electricity.

MR. CUNNINGHAM: Exactly.

MR. HASHEIDER: And from that standpoint, we would feel that it would be our ability to use that as even though it's used in the customer's household, it would be our ability to -- to take credit for that as a renewable --

MR. CUNNINGHAM: Okay. So you would just say -- if it's a two kilowatt system, you would say, all right, two kilowatts and we have average four and a half hours of sun daily per year and you'd come up with a number there without having a measurement device at the inverter?

MR. HASHEIDER: We would have a known system that would be used as a reference --

MR. CUNNINGHAM: Okay.

MR. HASHEIDER: -- in the plan, specifically one that we're installing -- planning to install.

MR. CUNNINGHAM: Okay. Excellent. That's all my questions. And thank you for doing this.

HEARING OFFICER CONWAY: Thank you, Frank.

Do we have other public comment?

There being no further public comment, in

conclusion, I might summarize for you that -- again, that we'll have written statements on net metering and interconnection will also be accepted for the two weeks after this public hearing. The comments can be mailed to myself, John Conway, Chairman of the Water and Light Advisory Board, Post Office Box 6015, Columbia, Missouri 65205.

With that, the public hearing is closed.

WHEREUPON, the hearing was adjourned.

CERTIFICATE OF REPORTER

I, Tracy L. Thorpe Taylor, a Certified Shorthand Reporter, within the State of Missouri, do hereby certify that the witness whose testimony appears in the foregoing deposition was duly sworn by me; that the testimony of said witness was taken by me to the best of my ability and thereafter reduced to typewriting under my direction; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this deposition was taken, and further, that I am not a relative or employee of any attorney or counsel employed by the parties thereto, nor financially or otherwise interested in the outcome of the action.

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Tracy L. Thorpe Taylor, CSR, CCR